

Description

[UNIVERSAL IN-LINE SKATES]

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the priority benefit of Taiwan application serial no.92205000, filed on March 31, 2003.

BACKGROUND OF INVENTION

[0002] Field of the Invention

[0003] The present invention relates to a pair of in-line skating shoes. More particularly, the present invention relates to a pair of universal in-line skating shoes whose wheel base length is adjustable and whose design permits the addition of extra wheels.

[0004] Description of Related Art

[0005] Roller skating is a healthy exercise for most people and can learned easily. In recent years, some schools even include skating as one of the physical training courses in class. Moreover, government institutions and recreational establishments often organize skating competitions or

shows to popularize such healthy activities.

[0006] However, the participants of most of these activities are children whose feet grow bigger every year. It often happens that a pair of skates bought last year become too small to wear this year. Hence, money has to be spent on a new pair of skating shoes once in a while especially for the younger kids. This is really a headache for their parents.

SUMMARY OF INVENTION

[0007] Accordingly, the present invention is directed to a pair of universal in-line skating shoes whose length can be adjusted and whose design permits addition of wheels thereto.

[0008] According to an embodiment of the present invention, a pair of universal in-line skating shoes is provided. The skates comprise a front base, a rear base, a shoe body, a number of wheel assemblies and two length-adjusting members. The front base has a pair of first side plates and a sole plate. The first side plates are connected to the sole plate. Each first side plate has at least a wheel axle hole. The rear base has a pair of second side plates and a heel plate. The second side plates are connected to heel plate. Each second side plate has at least a wheel axle hole. The

front portion of the shoe body is fastened to the sole plate while the rear portion of the shoe body is fastened to the heel plate. The wheel assemblies are set on the front base and the rear base of the skating shoe by pinning to the wheel axle holes of their respective side plates. The two length-adjusting members are replaceable. One end of each length-adjusting member is fastened to the first side plate while the other end of the length-adjusting member is fastened to the second side plate.

[0009] The aforementioned in-line skating shoes may further include a pair of wheel extension plates and at least an extension wheel. The wheel extension plates are fastened to the front end of the first side plates of the front base. Each wheel extension plate has at least a wheel axle hole. The extension wheel is mounted to the wheel extension plates by pivoting to the wheel axle hole.

[0010] If wheel extension plates are not fastened to the front base, a braking assembly can be installed. The braking assembly has two side surfaces that can be fastened the front end of to the first side plates. Through the side mounting design, a user may dismantle or replace the braking assembly while the shoe body is still fastened to the front base.

[0011] According to one embodiment of the present invention, the length of the in-line skating shoes can be adjusted by replacing the length-adjusting member. In addition, extra wheels (extension wheels) can be added by fastening additional wheel extension plates.

[0012] It is to be understood that both the foregoing general description and the following detailed description are exemplary, and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF DRAWINGS

[0013] The accompanying drawings are included to provide a further understanding of the invention, and are incorporated in and constitute a part of this specification. The following drawings illustrate embodiments of the invention and, together with the description, serve to explain the principles of the invention.

[0014] Fig. 1 is a schematic assembly/component view of a universal in-line skating shoe according to one embodiment of the present invention.

[0015] Fig. 2 is top view of an assembled universal in-line skating shoe (with the shoe body deleted) according to one embodiment of the present invention.

[0016] Fig. 3A is a view of the rear base in Fig. 1 when viewed

from the left side of the skating shoe.

[0017] Fig. 3B is a view of the front base in Fig. 1 when viewed from the right side of the skating shoe.

[0018] Fig. 4 is a perspective view showing the major components of a wheel assembly.

[0019] Figs. 5A, 5B and 5C are the top, the front and the side view of a length-adjusting member.

[0020] Fig. 6A is a magnified view showing one type of connection between the front base and the rear base through the length-adjusting member as shown in Fig. 2.

[0021] Fig. 6B is a magnified view showing another type of connection between the front base and the rear base through the length-adjusting member as shown in Fig. 2.

[0022] Fig. 6C is a magnified view showing one type of connection between the wheel extension plate and the front base as shown in Fig. 2.

[0023] Fig. 7 is a magnified view showing another type of connection between the wheel extension plate and the front base as shown in Fig. 2.

[0024] Fig. 8A is a view of the length-adjusting member in Fig. 1 when viewed from the left side.

[0025] Fig. 8B is a view of the wheel extension plate in Fig. 1 when viewed from the left side.

[0026] Figs. 9A through 9C show a cross-sections showing a few variations of the length-adjusting member.

DETAILED DESCRIPTION

[0027] Reference will now be made in detail to the present preferred embodiments of the invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers are used in the drawings and the description to refer to the same or like parts.

[0028] Fig. 1 is a schematic assembly/component view of a universal in-line skating shoe according to one embodiment of the present invention. As shown in Fig. 1, the in-line skating shoe 100 comprises a front base 102, a rear base 104 a shoe body 106, a plurality of wheel assemblies 108 (only four is shown), two length-adjusting member 110 (only one is shown because they are symmetrically positioned), two wheel extension plates 112 (only one is shown because they are symmetrically positioned) and at least an extension wheel 120 (only one is shown). Furthermore, a braking assembly 200 may replace the wheel extension plate 112 when there is no need to put on additional wheels.

[0029] Fig. 2 is top view of an assembled universal in-line skat-

ing shoe (with the shoe body deleted) according to one embodiment of the present invention. To simplify the sketch, the shoe body 106 is deleted from Fig. 2 (but can be seen in Fig. 1). Fig. 3A is a view of the rear base in Fig. 1 viewed from the left side of the skating shoe and Fig. 3B is a view of the front base in Fig. 1 viewed from the right side of the skating shoe. The front base 102 has a pair of first side plates 102a and a sole plate 102b. The pair of first side plates 102a are joined to the sole plate 102b. Each first side plate 102a has at least a wheel axle hole 150 (two are shown). The rear base 104 has a pair of second side plates 104a and a heel plate 104b. The pair of second side plates 104a are joined to the heel plate 104b. Each second side plate 104a has at least a wheel axle hole 150 (two are shown). The sole plate 102b is fastened to the front end of the shoe body 106 while the heel plate 104b is fastened to the back end of the shoe body 106. Rivets, nuts and screws or (sharp-headed) screws may be used to fasten the sole plate 102b and the heel plate 104b to the shoe body 106, for example.

[0030] In this embodiment, the front base and the rear base have a curved side surface (can be seen from Figs. 3A and 3B). However, to save processing cost, the side surface can be

a flat plate.

[0031] Fig. 4 is a perspective view showing the major components of a wheel assembly. As shown in Fig. 4, the wheel assembly 108 comprises a wheel 108a, a wheel axle 108b and a bearing 108c. The bearing 108c is set up in the center of the wheel 108a and the wheel axle 108b support the wheel 108a through the bearing 108c so that the wheel 108a is free to rotate. The respective ends of the wheel axle 108b are locked inside the wheel axle holes 150 of the pair of first side plates 102a and the pair of second side plates 104a so that wheel assemblies 108 are mounted on both the front base 102 and the rear base 104.

[0032] The method of locking the wheel axle to the first set of side plates and the second set of side plates includes using an axle screw with internal threads as a wheel axle and passing the screw through one of the side plates. Thereafter, another screw with external threads passes through the opposite side plate and tightens to the axle screw by screwing into the internal threads. Hence, both ends of the long axle screw are fastened to the side plates. However, this is just one example and other methods are available. In fact, any method capable of locking

the wheels onto the side plates and permitting the wheel to rotate freely may be used.

[0033] The length-adjusting member 110 is a replaceable unit. One end of each length-adjusting member 110 is connected to the first side plate 102a while the other end of the length-adjusting member 110 is connected to the second side plate 104a. There is no restriction on the material constituting the length-adjusting members 110. Fundamentally, the length-adjusting members 110 should be fabricated using a material with sufficient strength and toughness to resist deformation such as aluminum alloy or stainless steel.

[0034] Figs. 5A, 5B and 5C are the top, the front and the right side view of a length-adjusting member. As shown in Fig. 5C, the length-adjusting member 110 has a rectangular shape when looked upon from one side. As shown in Fig. 5B, the length-adjusting member 110 comprises a front connecting section 110a, a rear connecting section 110b and a length expansion section 110c. The front connecting section 110 and the rear connecting section 110b are linked through the length expansion section 110c.

[0035] According to the top view in Fig. 5A, the length-adjusting member 110 has a greater thickness in the length expan-

sion section 110b and a smaller thickness in the front connecting section 110a and the rear connection section 110c one each side. The thickened length expansion section 110b server to stabilize the front connecting section 110a and the rear connecting section 110c. However, the shape of the length-adjusting member 110 is not limited as such. For example, the length-adjusting member can be a flat plate with a variation in its external profile instead of a variation in thickness to increase connection stability.

[0036] To increase the stability between the length-adjusting member and the front, rear connecting section, a groove is formed on the first side plates and the second side plates at a position that corresponds with the respective front and rear connecting sections. The groove on the first and second side plates is formed by milling using a milling machine, for example.

[0037] Fig. 6A is a magnified view showing one type of connection between the first side plate 102a of the front base 102 and the second side plate 104a of the rear base 104 through the length-adjusting member 110 as shown in Fig. 2. As shown in Fig. 2, the rear end of the first side plate 102a has a first groove section 180 and the front

end of the second side plate 104a has a second groove section 190. The front connecting section 110a and the rear connecting section 110b each has a plurality of screw holes 160 (only four is shown). Similarly, the first groove section 180 and the second groove section 190 each has a plurality of screw holes 160. The front connecting section 110a of the length-adjusting member 110 stacks over the first groove section 180 of the first side plate 102a while the rear connecting section 110b of the length-adjusting member 110 stacks over the second groove section 190. Thereafter, the side plates 102a, 104a and the length-adjusting member 110 are fastened together using a set of screws 170.

[0038] It should be noted that the screws 170 may be tightened inside-out or outside-in as long as it does not prevent the rotation of the wheel assemblies 108. For example, the side plates and the length-adjusting member can be joined together by rotating the screws into a corresponding nut such that the nut is incapable of touching the wheels. Alternatively, the side plates and the length-adjusting member can be joined together by rotating screws into a corresponding screw hole with a counter-sunk top.

- [0039] As shown in Fig. 2, the length-adjusting member 110 is connected to the front base 102 and the rear base 104 by stacking the first and second groove section 180, 190 of the first, second side plate 102a, 104a over the front, rear connecting section 110a, 110b respectively. However, side plates without any groove section may be used for joining directly with a flat piece of length-adjusting member.
- [0040] Since the first side plates and the second side plates have some side curvature, the length-adjusting member must match the contour of the first side plate and the second side plate. Fig. 8A is a view of the length-adjusting member in Fig. 1 viewed from the left side. The particular shape of the length-adjusting member is formed in a punching process, for example.
- [0041] Obviously, if the first side plates and the second side plates are flat panels without any side curvature, a flat piece of length-adjusting member may stack over the first side plate and the second side plate to join them together. In other words, the length-adjusting member can be a flat plate (not shown) under these circumstances.
- [0042] When there is no need to form a groove section on the first side plates or the second side plates, the total thickness of the section linking the length-adjusting member

with the front base or the rear base is increased. This permits the formation of a threaded hole with a countersunk top within the length-adjusting member 110 and a threaded hole within the side plates 104a, 102a. Thus, screws that rotate into the threaded hole may be used to tighten the length-adjusting member 110 and the side plates 104a, 102a together (as shown in Fig. 6B).

[0043] According to one embodiment of the present invention, the length-adjusting members of different length (whose front and rear connecting sections are identical, only the length in the expansion section is different) can be deployed to adjust the length of the pair of universal in-line skating shoes. Furthermore, various components of the skating shoe including the length-adjusting member, the front base and the rear base can be standardized. If only the length of the shoes needs to be adjusted, the adjustment can be made through a replacement of the original length-adjusting member with one having a different length. Therefore, no money is wasted in purchasing a pair of new skates.

[0044] Fig. 7 is a magnified view showing another type of connection between the wheel extension plate 112 and the first side plate 102a as shown in Fig. 2. As shown in Fig.

2, the wheel extension plates 112 are fastened to the front end of the respective first side plates 102a of the front base 102. Each wheel extension plate 112 has at least a wheel axle hole 152 (only one is shown). Furthermore, the front end of each first side plate 102a has a first groove section 130 and the rear end of the wheel extension plate 112 has a second groove section 140. The first groove section 130 on the first side plate 102a and the second groove section 140 on the wheel extension plate 112 both have a plurality of screw holes 162 (only three is shown in Fig. 1). The second groove section 140 of the wheel extension plate 112 and first groove section 130 of the first side plate 102a are stacked over each other and tightened together using a set of screws 170. Thereafter, a set of extension wheel assembly 120 is installed between the wheel extension plates 112 by mounting the wheel axle on the axle holes 152. Since the extension wheel assembly 120 is identical to the wheel assembly 108, a detailed description is omitted.

[0045] It should be noted that the wheel extension plate 112 and the first side plate 102a could be tightened together by passing the screws 170 inside out or outside in. The only criterion is that the screws must not block the rotation of

the wheel assembly 120. Because the methods of engaging the plates together have been described before, such description is omitted here.

[0046] Similarly, joining the wheel extension plate to the front base through an overlapping groove section is only one of possible type of connection. Since the type of connection is similar to joining the length-adjusting member to the front or rear base, the wheel extension plate may join up with the front base directly without having to prefabricate any groove section in the wheel extension plate or the first side plate.

[0047] Because the first side plate originally has a curve side profile, the wheel extension plate must match the profile variation of the first side plate. Fig. 8B is a view of the wheel extension plate 112 in Fig. 1 viewed from the left side. The wheel extension plate is formed in a punching process, for example.

[0048] Similarly, if the first side plates are flat panels without any side curvature, a flat piece of wheel extension plate may stack over the first side plate to join them together with screws. In other words, the wheel extension plate can be a flat plate (not shown) under these circumstances.

[0049] When there is no need to form a groove section on the

first side plates or the wheel extension plates, the total thickness of the section linking the first plate with the wheel extension plate is increased. This permits the formation of a threaded hole with a countersunk top within the wheel extension plate 112 and a threaded hole within the first side plate 102a. Thus, screws that rotate into the threaded hole may be used to tighten the wheel extension plate 112 and the side plate 102a together (as shown in Fig. 6C).

[0050] The braking assembly 200 in Fig. 1 comprises a braking base 200a and a braking head 200b. The braking base 200a has two side surfaces 202 (only one side surface is shown) each having at least a screw hole (two screw holes 162 and 204 are shown). The first side plate 102a of the front base 102 has a corresponding set of screw holes 162 and 204. Therefore, the braking base 200a and the front base 102 are joined together by screwing into the screw holes 162 and 204. In other words, the two side surfaces 202 of the braking base 200a are fastened to the front end of the first side plates 102. The braking head 200b is fastened to the braking base 200a.

[0051] One of the screw holes 162 on the front base 102 can be used for mounting the wheel extension plate 112 and the

braking base 200a. In other words, the particular screw hole 162 is used when the wheel extension plate 112 or the braking assembly 200 is attached to the front base 102.

[0052] With the braking base 200a fastened through the side surfaces 202, the braking base 200a can be replaced or dismantled when the shoe body 106 is still attached to the front base 102.

[0053] The aforementioned length-adjusting member serves as an illustration showing the technique of connecting the front base and the rear base together. The length-adjusting member is replaceable and can have the following variations.

[0054] Figs. 9A through 9C show a cross-sections showing a few variations of the length-adjusting member. To simplify the drawing, locations of the screw holes are not drawn. The length-adjusting member can have a number of different sectional profiles. For example, the length-adjusting member 210 in Fig. 9A has a U-shaped profile, the length-adjusting member 220 in Fig. 9B has a C-shaped profile and the length-adjusting member 230 in Fig. 9C has an O-shaped profile.

[0055] According to one embodiment of the present invention,

the base is divided for holding the wheels of the universal in-line skating shoe up into a front base and a rear base so that the front base and the rear base are connected through a replaceable length-adjusting member. The user is able to adjust the length of the pair of skates by replacing the length-adjusting member. Furthermore, a wheel extension plate can be attached to the front base to provide additional wheels.

[0056] It will be apparent to those skilled in the art that various modifications and variations can be made to the structure of the present invention without departing from the scope or spirit of the invention. In view of the foregoing, it is intended that the present invention cover modifications and variations of this invention provided they fall within the scope of the following claims and their equivalents.